

VIVEKANANDHA
COLLEGE OF ARTS AND SCIENCES FOR WOMEN
(AUTONOMOUS)

ELAYAMPALAYAM, THIRUCHENGODE (Tk.), NAMAKKAL (Dt.) - 637 205
(Affiliated to Periyar University, Approved by AICTE & Re-Accredited with “A” by NAAC)



DEPARTMENT OF BOTANY
BACHELOR OF SCIENCE
SYLLABUS & REGULATIONS

CANDIDATES ADMITTED FROM 2014 -15 ONWARDS
UNDER AUTONOMOUS AND CBCS PATTERN

VIVEKANANDHA EDUCATIONAL INSTITUTIONS
ANGAMMAL EDUCATIONAL TRUST
ELAYAMPALAYAM, THIRUCHENGODE (Tk.), NAMAKKAL (Dt.) - 637 205

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(AUTONOMOUS – 2014-2015)

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B.Sc., Botany – Branch V

For Candidates Admitted from 2014 – 2015 Onwards Under CBCS Pattern

1. Scope of the Department

Botany is a classical science dealing with not merely the morphology of plants but also their functional aspects and economic importance. Further, the study helps us to understand the role of plants in maintaining the environment besides, saving as a renewable energy sources. Plants are most valuable in treating the ailments of mankind. It has several branches such as Plant Morphology, Taxonomy, Anatomy, Embryology, Plant Pathology, Physiology, Ecology, Plant Diversity, Ethnobotany, Genetics, Biotechnology, Plant Physiology, Biochemistry, Horticulture, Medicinal Plants, Organic Farming, etc., besides serving as the basis for several other biosciences. It is a basic science with several research disciplines like modern transgenic biology.

2. Objectives of the course

This course enables the students

- ❖ To gain knowledge of the importance of plants in sustaining life on earth.
- ❖ To acquire skills in drawing by actual observation at its original and natural condition.
- ❖ To know the nutritive value of food and maintain 'Health Care Problems'.
- ❖ To create awareness in understanding the extinction plants.
- ❖ To create awareness of natural resources and methods of conservation.
- ❖ To create environmental awareness to overcome pollution.
- ❖ To develop skills in students in growing various horticultural plants thereby to raise a nursery.
- ❖ To motivate self-employment by knowledging and practicing in the preparation of bio-fertilizers.
- ❖ 'Earn while learn' can be done with the acquirement of basic knowledge in growing some medicinal plants & mushrooms.

- ❖ To gain knowledge for exploration of new plants their unknown values and unknown values of known plants.
- ❖ To gain a knowledge for the techniques of producing desirable plants through the study of molecular biology and genetic engineering.
- ❖ The syllabus content is mainly revised based on the TRB Syllabus.

3. Conditions for Admission:

A candidate who has passed Higher Secondary Examination in academic or vocational stream with Botany under Higher Secondary Board of Examinations, Tamil Nadu or an examination accepted as equivalent there to or as per norms said by the Government of Tamil Nadu are permitted to appear and qualify for B.Sc., Degree examination of this university after a course of study of three academic years.

4. Duration of the Course:

The course for the degree of Bachelor of Science in Botany shall consist of three academic years divided into six semesters.

5. Course of Study:

The course of study shall comprise of instruction in the following subjects according to the syllabus and books prescribed from time to time.

Semester I

1. Foundation Tamil - I
2. Foundation English - I
3. Core Course I – Plant Diversity –I
4. Core Course II Practical I - Carried over to II Semester
5. First Allied Paper I - Zoology
6. First Allied II --Practical - Carried over to II Semester
7. Value Education - Yoga

Semester II

8. Foundation Tamil – II
9. Foundation English - II
10. Core Course III – Plant Diversity -II
14. Core Course II- Practical –I Comprising Core Course I & III
15. First Allied Paper II - Zoology

13. First Allied II Practical - Cont. from I Semester
14. Value Education – Environmental Studies.

Semester III

15. Foundation Tamil - III
16. Foundation English - III
17. Core Course IV – Mushroom Cultivation Technology
18. Core Course V - Practical II - Carried over to IV Semester
19. Second Allied Paper I - Chemistry
20. Second Allied II Practical - Chemistry
21. SBEC I – Economic Botany
22. NMEC I - Sericulture

Semester IV

23. Foundation Tamil - IV
24. Foundation English - IV
25. Core Course VI - Anatomy, Embryology and Seed Science
26. Core Course V - Practical II. Comprising Core Course IV & VI.
27. Second Allied Paper II - Chemistry
28. Second Allied Practical II Chemistry. Cont. from III Semester
29. SBEC II – Fundamentals of Microbiology and Plant pathology.
30. NMEC II - Apiculture

Semester V

31. Core Course VII – Morphology and Taxonomy of Angiosperms.
32. Core Course VIII - Cell Biology and Genetics
33. Core Course IX – Plant Ecology, Phytogeography and Conservation Biology
34. Core Course X - Practical III.*
35. Core Course XI - Practical IV.*
36. Elective I - Plant Breeding and Evolution
37. SBEC III - Horticulture and Nursery Management.
38. SBEC IV - Fundamentals of Computer Application

Semester VI

39. Core Course XII - Plant Physiology and Biochemistry
40. Core Course XIII – Group Project (Minor)
41. Core Course X - Practical III (For Core Course VII – Morphology and Taxonomy of Angiosperms, Core Course VIII - Cell Biology and Genetics and from V Semester)
42. Core Course XI - Practical IV (For Core Course XII - Plant Physiology and Biochemistry & Core Course IX - Plant Ecology, Phyto-geography and Conservation Biology)
43. Elective II – Ethnobotany, Medicinal Plants and their Utilization
44. Elective III - Plant Biotechnology, Microscopy and Micro-technique.
45. SBEC V – Organic Farming
46. SBEC VI – Herbal Home Remedies
47. Extension Activities.

6. Examination:

The theory examination shall be of three hours duration to each paper at the end of the semester. The candidates failed in any subject will be permitted to appear for each failed subject or subjects in the subsequent examination. The practical examination is also of three hours duration at the end of even semester. However in the final semester examination if the failure one or two subjects they can appear for a supplementary exam within a month.

The examination consists of Continuous Internal Assessment (CIA) and External Assessment (EA).

Internal Assessment Marks for Theory papers are as follows

Attendance	- 5 Marks
Assignment	- 5 Marks
Test	- 5 Marks
Model	- 10 Marks
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Total	- 25 Marks
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Internal Assessment Marks for Practical papers are as follows

Attendance -10 Marks

Observation -10 Marks

Test - 20 Marks

Total - 40 Marks

Distribution of Marks for Attendance:

Percentage	Marks	
	Theory	Practical
75 - 80	1	2
81 - 85	2	4
86 - 90	3	6
91 - 95	4	8
96 - 100	5	10

Note:

Minimum 75 % of attendance is compulsory to sit for the exam. A Condonation can be permitted between 65 % to 74.9 %.

7. Scheme of Examination:

The scheme of Examinations for different semesters shall be as follows

B.Sc., Botany - Choice Based Credit System
(For the candidates admitted from the Academic year 2014 - 2015 Onwards)

Sem	Part	Course	Code	Title	Inst. Hrs.	Credit	Exam Hrs.	Marks		
								CIA	EA	Total
I	I	Tamil I	14U1LT01	Foundation Tamil I	6	3	3	25	75	100
	II	English I	14U1LE01	Foundation English I	6	3	3	25	75	100
	III	Core Course I	14U1BOC01	Plant diversity –I (Algae, Fungi and Lichens)	6	5	3	25	75	100
		Core Course II (Practical)	14U2BOCP01	Algae, Fungi and Lichens (Examination at the end of II Semester)	3	-	-	-	-	-
		First Allied I	14U1ZOA01	Zoology I	4	3	3	25	75	100
		First Allied II (Practical)	14U2ZOAP01	Zoology	3	-	-	-	-	-
	IV	Value Education	14U1VE01	Yoga	2	2	3	25	75	100
				Total	30	16		125	375	500
II	I	Tamil II	14U2LT02	Foundation Tamil II	6	3	3	25	75	100
	II	English II	14U2LE02	Foundation English II	6	3	3	25	75	100
	III	Core Course III	14U2BOC02	Plant diversity – II (Bryophytes, Pteridophytes, Gymnosperms and Paleobotany)	6	5	3	25	75	100
		Core Course II (Practical)	14U2BOCP01	Cont. From I Semester Comprising Core Course I – Algae, Fungi and Lichens & Core Course III - Bryophytes, Pteridophytes, Gymnosperms and Paleobotany	3	3	3	40	60	100
		First Allied III	14U2ZOA02	Zoology II	4	4	3	25	75	100
		First Allied II (Practical)	14U2ZOAP01	Allied Zoology practical Cont. From I Semester	3	3	3	40	60	100
	IV	Value Education	14U2ES01	Environmental Studies	2	2	3	25	75	100
				Total	30	23		205	495	700

III	I	Tamil III	14U3LT03	Foundation Tamil III	6	3	3	25	75	100
	II	English III	14U3LE03	Foundation English III	6	3	3	25	75	100
	III	Core Course IV	14U3BOC03	Mushroom cultivation Technology	4	5	3	25	75	100
		Core Course V (Practical)	14U3BOCP02	Core Course IV Mushroom cultivation Technology (Examination at the end of IV Semester)	3	-	-	-	-	-
		Second Allied I	14U3CHA01	Chemistry I	4	3	3	25	75	100
		Second Allied II Practical	14U3CHAP01	Chemistry	3	-	-	-	-	-
	IV	SBEC I	14U3BOS01	Economic Botany	2	2	3	25	75	100
		NMEC I	14U3ZON01	Sericulture	2	2	3	25	75	100
				Total	30	18		150	450	600
IV	I	Tamil IV	14U4LT04	Foundation Tamil IV	6	3	3	25	75	100
	II	English IV	14U4LE04	Foundation English IV	6	3	3	25	75	100
	III	Core Course VI	14U4BOC04	Anatomy, Embryology and Seed Science	4	5	3	25	75	100
		Core Course V (Practical)	14U4BOCP02	Comprising Core Course IV Mushroom cultivation Technology & Core Course VI - Anatomy, Embryology and Seed Science Carried From III Semester	3	4	3	40	60	100
		Second Allied III	14U4CHA02	Chemistry II	4	3	3	25	75	100
		Second Allied II Practical	14U4CHAP01	Chemistry	3	3	3	40	60	100
	IV	SBEC II	14U4BOS02	Fundamentals of Microbiology and Plant Pathology	2	2	3	25	75	100
		NMEC II	14U4ZON02	Apiculture	2	2	3	25	75	100
				Total	30	25		230	570	800

V	III	Core Course VII	14U5BOC05	Morphology and Taxonomy of Angiosperms	5	5	3	25	75	100
		Core Course VIII	14U5BOC06	Cell Biology and Genetics	5	5	3	25	75	100
		Core Course IX	14U5BOC07	Plant Ecology, Phytogeography and Conservation Biology	4	5	3	25	75	100
		Core Course X (Practical)	14U6BOCP03	For Core Course VII- Morphology and Taxonomy of Angiosperms (Examination at the end of VI Semester)	3	-	-	-	-	-
		Core Course X (Practical)	14U6BOCP03	For Core Course VIII - Cell Biology and Genetics (Examination at the end of VI Semester)	3	-	-	-	-	-
		Core Course X (Practical)	14U6BOCP03	For Core Course IX - Plant Ecology, Phytogeography and Conservation Biology (Examination at the end of VI Semester)	3	-	-	-	-	-
		Elective I	14U5BOE01	Plant breeding and Evolution	5	5	3	25	75	100
		SBEC III	14U5BOS03	Horticulture and Nursery management	2	2	3	25	75	100
		SBEC IV	14U5BOS04	Fundamentals of Computer Application	2	2	3	25	75	100
				Total	30	22		150	450	600
VI	III	Core Course XI	14U6BOC08	Plant Physiology and Biochemistry	6	5	3	25	75	100
		Core Course XII	14U6BOPR01	Group project	5	5	3	25	75	100
		Core Course X (Practical)	14U6BOCP03	For Core Course VII- Morphology and Taxonomy of Angiosperms, Core Course VIII- Cell Biology and Genetics.	-	6	3	40	60	100
		Core Course XIII (Practical)	14U6BOCP04	For Core Course XI - Plant Physiology and Biochemistry& Core Course XII - Plant Ecology, Phytogeography and Conservation Biology	6	5	3	40	60	100

VI	Elective II	14U6BOE02	Ethnobotany, Medicinal Plants and their Utilization	5	5	3	25	75	100
	Elective III	14U6BOE03	Plant Biotechnology, Microscopy and Microtechnique	5	5	3	25	75	100
	SBEC V	14U6BOS05	Organic farming	3	2	3	25	75	100
	SBEC VI	14U6BOS06	Herbal Home remedies	3	2	3	25	75	100
	Extn. Activities	14U6EX01		-	1	-	-	-	-
				Total	30	36		230	570
Total No. of Hours and Credits				180	140		4000		

8. Question Paper Pattern for B.Sc., Botany Course

Time: 3 Hrs

Max. Marks: 75

PART – A (10 x 2 = 20 Marks)
(Answer all questions)

PART – B (5 x 5 = 25 Marks)
(Answer all questions)
(One question from each unit with internal choice)

PART – C (3 x 10 = 30 Marks)
(Answer any three questions)
(One question from each unit)

9. Passing Minimum:

The Candidate shall be declared to have passed the examination if the candidate secures not less than 30 marks out of 75 marks in the university examination in each theory paper. There is no passing minimum for internal assessment.

For the practical paper, a minimum of 24 marks out of 60 marks in the University practical examination and the record notebook taken together. There is no passing minimum for internal assessment and record note book. However submission of a record note book is a must.

Candidate who does not obtain the required minimum marks for a pass in a paper shall be required to appear and pass the same at a subsequent appearance.

10. Classification of successful candidates

Candidates who secure not less than **60%** of the aggregate marks in the whole examination shall be declared to have passed the examination in **First class**.

All other successful candidates shall be declared to have passed in the **Second class**.

Candidates who obtain 75% of the marks in the aggregate shall be deemed to have passed the examination in **First class with Distinction** provided they pass all the examinations prescribed for the course at the first appearance.

14. Maximum duration for the completion of the UG Programme

The maximum duration for completion of the UG Programme shall not exceed 6 semesters.

15. Commencement of this regulation

These regulations shall take effect from the academic year 2014-15, i.e., for students who are to be admitted to the first year of the course during the academic year 2014-15 and thereafter.

13. Transitory Provision

Candidates who were admitted to the UG course of study before 2014-15 shall be permitted to appear for the examinations under those regulations for a period of three years i.e., up to and inclusive of the examination of April / May 2015. Thereafter, they will be permitted to appear for the examination only under the regulations then in force.

B.Sc., Botany

For Students Admitted from the academic year 2014 – 2015

Semester I - Core Course I (Paper Code: 14U1BOC01)

Plant Diversity-I (Algae, Fungi and Lichens)

Max. Marks: 75

Credits: 5

Total hrs: 60

Objectives:

- To study about the general characters, Classification and Economic importance of Algae.
- To understand the structure, reproduction and life cycle of some important algal genera.
- To study about the general characters, Classification and Economic importance of Fungi.
- To understand the structure, reproduction and life cycle of some important fungal genera.
- To study about the general characters, structure and Economic importance of Lichen.

Algae

Unit- I

(11 hrs)

General Characters (Cyanophyceae, Chlorophyceae, Phaeophyceae and Rhodophyceae) structure, organisation, reproduction, life history and Classification of algae by F. E. Fritsch (1935). Economic importance of Algae – Source and uses of Agar agar, Carrageenin, SCP, Chlorellin and Diatomite. Algae and sewage disposal. Algae as food and fodder. Algae as indicators of pollution.

Unit -II

(15 hrs)

A detailed study on the structure, reproduction and lifecycle of the following genera; *Oscillatoria*, *Chlamydomonas*, *Oedogonium*, *Caulerpa*, *Sargassum* and *Polysiphonia*.

Fungi

Unit -III

(10 hrs)

Fungi - Classification (Alexopoulos and Mims 1979). A systematic study of the range of structure, reproduction, life cycles, Economic importance of fungi.

Unit- IV**(14 hrs)**

A study of the occurrence, structure, reproduction and life cycle of the following genera – *Albugo*, *Saccharomyces*, *Peziza*, *Puccinia* and *Cercospora*.

Unit- V**Lichen****(10 hrs)**

General characters – Occurrence, classification, structure, reproduction and economic importance of lichens.

Text Books:

1. Text book of Algae. 2015, K.S.Bilgrami and L. C. Saha, 1st Edition, CBS Publishers.
2. Algae O. P. Sharma 2011, Tata McGraw-Hill Education.
3. *Sohan Sharma, 2012. Advances In Mycology*, Random Publications Publishers and Distributors, New Delhi.
4. Kumar H. D. and Singh H. N. 1976. A text book of algae. Affiliated East West Press Pvt. Ltd. New Delhi.
5. Misra A. and Agarwal R. P. 1970. Lichens. A preliminary text. Oxford and IBH Publishing Company.
6. Srivastava J.P. 1970. An introduction to Fungi. Central book depot, Allahabad.
7. Dube H. C. 1978. A text book of Fungi, Bacteria and Viruses. Vikas Publishing House (P) Ltd.
8. Kumurasen V. 1997. Algae and Bryophytes, Saras Publication, Nagarkovil, India.

Reference Books:

1. Vashishta B. R. A. K. Sinha. 2010. Botany for Degree student – Fungi. S. Chand & Co. New Delhi.
2. C. J. Alexopoulos, C. W. Mims, M. Blackwell. 2007. Introductory mycology. John Wiley.
3. Vashishta B. R. A. K. Sinha, V. P. Singh. 2010. Botany for Degree student – Algae. S. Chand & Co. New Delhi.
4. Kumar H. D. 1990. Introductory Phycology. Affiliated East West Press Pvt. Ltd. New Delhi.
5. Ainsworth G. C. and Alfred S. 1973. The Fungi (An advanced treatise) Academic Press, New York.

B.Sc., Allied Botany – CBCS Pattern

For Students Admitted from the academic year 2014 – 2015

Semester I – First Allied Course I (Paper Code – 14U1BOA01)

Morphology, Taxonomy of Angiosperms, Cytology, Genetics, Anatomy and Embryology of Angiosperms.

Credits: 3

Total hrs: 60

Objectives:

- To understand the external morphology of angiosperms.
- To study the some important angiosperm families.
- To study above the cell organelles and functions.
- To understands the plant tissues and internal structure of angiosperms.
- To understand the embryology of Angiosperms.

Unit 1

(15 hrs)

External morphology: Types of leaf- Simple and compound. Inflorescence - Racemose, Cymose, Special types (Head, Cyathium). Terminology with reference to Flower description.

Unit II

(15 hrs)

Taxonomy: Bentham and Hookers system of classification. Study of the following families and their economic importance: Annonaceae, Leguminosae, Cucurbitaceae and Asteraceae.

Unit III

(15 hrs)

Cytology: Ultra structure of plant cell and brief outline of the following organelles: endoplasmic reticulum, mitochondria, chloroplast and nucleus. Cell division: mitosis and meiosis. Genetics- Mendel's mono and dihybrid cross. Incomplete dominance in monohybrid.

Unit IV

(15 hrs)

Anatomy: Simple and permanent tissues: Parenchyma, collenchyma, sclerenchyma. Complex permanent tissues: Xylem and phloem. Primary structure of dicot stem and dicot root.

Unit V

(15 hrs)

Embryology: Structure of anther, male gametophyte. Types of ovule and female gametophyte (Polygonum type). Fertilization. Structure and development of dicot embryo (Capsella type – *Bursa pastoris*).

Text Books:

1. B.P. Pandey 2011, A Textbook of Botany: Angiosperms - Taxonomy, Anatomy, Embryology and Economic Botany, S. Chand Limited.
2. Annie Roland, 2005. Taxonomy of angiosperms, Saras Publication, Nagercoil.
3. Pandey, B. P. 2001. Plant anatomy, S. Chand & Co., New Delhi.

References:

1. Bhojwani, S.S. and Bhatnagar, S.P. 2009. The Embryology of Angiosperms, Vikas Publishing House Pvt. Ltd., New Delhi.
2. Davis, P.H. and Heywood, V.M. 1965. Principles of Angiosperm Taxonomy. Oliver and Boyd Edinburgh.
3. Sambamurthy, A. V. S. S. 1999. Genetics. Narosa Publishing House, New Delhi.

B.Sc., Botany

For Students Admitted from the academic year 2014 – 2015

Semester II - Core Course III (Paper Code: 14U1BOC02)

Plant Diversity-II

(Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)

Credit : 5

Total Hrs. : 60

Objectives:

- To understand the morphology, internal structure, reproduction and life cycle of Bryophytes
- To study the general characters, Classification, life cycle of Pteridophytes.
- To understand the morphology, internal structure, reproduction and life cycle of Pteridophytes
- To understand the morphology, internal structure, reproduction and life cycle of Gymnosperms.
- To study the some important pteridophytes and gymnosperms fossil forms.

Bryophytes

Unit I (12 hrs)

General characters of Bryophytes. Classification of Bryophytes proposed by Rothmaler 1951. A detailed study of the structure, reproduction and life cycle of the following genera (Excluding developmental stages of sex organs and sporophyte). *Riccia*, *Anthoceros* and *Polytrichum*.

Pteridophytes

Unit II (12 hrs)

General characters and Ecology of Pteridophytes, Classification of Pteridophytes (Reimer's 1954), Life cycle of Pteridophytes. Stellar evolution in Pteridophytes, Sporangial organization – Homospory and Heterospory.

Unit III (12 hrs)

Morphology, Anatomy, Reproduction and life cycle of the following genera *Lycopodium*, *Selaginella* and *Marsilea*.

Gymnosperms

Unit IV

(12 hrs)

General characters of sporophytes and gametophytes in Gymnosperms. Classification (Pilger and Melchior, 1954). Morphology, structure, mode of reproduction and life history of the following genera: *Cycas* and *Pinus*

Palaeobotany

Unit V

(12 hrs)

Palaeobotany – fossils, methods and Techniques of fossilization. Geological time scale. Brief study of the following fossil forms-*Rhynia*, *Lepidodendron*, *Lepidocarpon*, *Calamites*, and *Williamsonia*.

Text books:

1. S.N.Pandey, S.P.Misra, P.S.Trivedi 2009. A text book of Botany Volume-II Vikas Publishing House Pvt. Ltd., Delhi.
2. Vashishta, P.C., Sinha.A. and Anil Kumar 2009. Botany for Degree Students,- Pteridophyta, S.Chand& Co. Pvt. Ltd.,
3. Vashishta B. R. 1983. Botany for Degree student – Bryophyta. S. Chand & Co. New Delhi.
4. Vashishta, P.C.1972 Botany for Degree Students, Vol IV- Vascular Cryptogams (Pteridophyta), S.Chand& Co. Pvt. Ltd.,
5. Vashishta, P.C. 1976 Gymnosperms, S.Chand& Co. Pvt. Ltd.,
6. Pandey, B.P.1997. A text book of Bryophyta, Pteridophyta and Gymnosperms. K.Nanth and Co., Meerut.
7. Parihar, N.S.1997. An introduction to Embryology. Vol-II. Pteridophyta and Gymnosperms. K.Nanth and Co., Meerut.
8. Shukla, A.C. and Mishra, S.P.1982. Essentials Palaeobotany, Vikas Publishing House Pvt. Ltd., Delhi.

Reference Books:

1. Smith, G.M.1935. Cryptogamic Botany. Vol-III, Tata McGraw Hill Publishing Co.,
2. Earnes, A.J.1936. Morphology of Lower Vascular Plants. Tata McGraw Hill Publishing Co., New Delhi.
3. Arnolds, C.A. 1947. An introduction to Palaeobotany, McGraw Hill Book Co.,Newyork.
4. Sporne, K.R. 1991. The Morphology of Angiosperms. B.I. Publications Pvt. Mumbai.
5. Sporne. K.R. 1991. The Morphology of Gymnosperms. B.I. Publications Pvt. Mumbai.
6. Skula, A.C. and Sharma, M.1992. Plant fossils. A link with the past, BirbalShani Institute Palaeobotany, Lucknow, India.

Core Practical
For students admitted from the academic year 2014 – 2015
Core Major Practical I (Core Course II) 14U2BOCP01
Plant Diversity-I (Algae, Fungi and Lichens)

Study of morphology and Anatomy of the vegetative and reproductive organs of the following taxa

Algae

1. Study of morphology, vegetative and reproductive organs of *Oscillatoria*
2. Study of morphology, vegetative and reproductive organs of *Chlamydomonas*
3. Study of morphology and anatomy of the vegetative and reproductive organs of *Caulerpa*
4. Study of morphology of the vegetative and reproductive organs of *Chara*
5. Study of morphology and Anatomy of the vegetative and reproductive organs of *Sargassum*
6. Study of morphology ,vegetative and reproductive organs of *Polysiphonia*
7. Economic importance of Algae

Fungi

1. Study of morphology and Anatomy of the vegetative and reproductive organs of *Albugo*
2. Study of morphology of *Saccharomyces*
3. Study of morphology of *Penicillium*
4. Study of morphology and Anatomy of *Peziza*
5. Study of morphology and Anatomy and reproductive organs of *Puccinia*
6. Study of morphology and Anatomy of *Cercospora*.
7. Economic importance of Fungi

Lichenology:

Study of morphology of Lichens

Core Practical

For students admitted from the academic year 2014 – 2015

Core Major Practical I (Core Course III) 14U2BOCP01

Plant Diversity-II - (Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)

Bryophytes:

1. Study of morphology and Anatomy of the vegetative and reproductive organs of *Riccia*
2. Study of morphology and Anatomy of the vegetative and reproductive organs of *Anthoceros*
3. Study of morphology and Anatomy of the vegetative and reproductive organs of *Polytrichum*

Pteridophytes:

1. Study of morphology and anatomy of vegetative and reproductive organs of *Lycopodium*.
2. Study of morphology and anatomy of vegetative and reproductive organs of *Selaginella*.
3. Study of morphology and anatomy of vegetative and reproductive organs of *Marsilea*.

Gymnosperms:

1. Study of sporophyte of *Cycas*
2. Study of gametophyte of *Cycas*
3. Study of sporophyte of *Pinus*
4. Study of gametophyte of *Pinus*

Palaeobotany:

1. Study of the fossil – *Rhynia*, *Lepidodendron*
2. Study of the fossil– *Lepidocarpon*, *Calamites* and *Williamsonia*

Core Practical

Model Practical Question Paper B.Sc., Botany Degree Examination

For Students Admitted from the academic year 2014 – 2015

Core Major Practical I (For Core Course I & III)

Plant Diversity-I &II

(Algae, Fungi and Lichens, Bryophytes, Pteridophytes, Gymnosperms and Palaeobotany)

Time: 3 Hrs.

Maximum: 60 Marks

Practical : 50 Marks

Record : 10 Marks

1. Cut transverse section of “**A, B, C, D & E**”. Stain and mount in glycerin
Identify giving reasons. Draw diagrams. Leave the slides for valuation. (20)
2. Draw diagrams and write notes of interest on “**F,G, H, I & J**” (10)
3. Name the Genus, Group and Morphology of given part of “**K,L, M, N, O**”
Diagrams not necessary (15)
4. Identify and write notes on the economic importance of “**P& Q**” (5)

Key:

A, B, C, D & E– Sectioning of materials from Algae, Fungi, Bryophytes, Pteridophytes and Gymnosperms.

“**F, G, H, I & J** – Spotters – Permanent micro slides - Fungi, Bryophyte, Pteridophytes, Gymnosperms & Lichen

“**K, L, M, N, O**” – Macroscopic specimens - Algae, Fungi, Bryophyte, Pteridophytes and Gymnosperms/Palaeobotany

P & Q – Economic importance - Algae and Fungi.

B.Sc., Allied Botany – CBCS Pattern

For Students Admitted from the academic year 2014 – 2015

Semester II – First Allied Course II (Paper Code – 14U1BOA02)

Thallophyta, Bryophyta, Pteridophyta, Gymnospermae, Physiology and Ecology.

Credits: 4

Total hrs: 60

Objectives:

- To study about the general characters, Classification and Life cycle of Algae.
- To study about the general characters, Classification and Life cycle of Fungi.
- To study the morphology, internal structure, reproduction and life cycle of *Funaria*, *Lycopodium* and *Cycas*.
- To understand the osmosis, water absorption, Photosynthesis and Photoperiodism.
- To understand the Plant Ecology.

Unit I (12 hrs)

Thallophyta: Algae- general characters of algae. A study on the structure and life cycle of the following genera- *Oscillatoria*, *Oedogonium* and *Polysiphonia*.

Unit II (12 hrs)

Fungi; General characters. A study on the structure and life cycle of the following genera- *Albugo*, *Penicillium* and *Agaricus*. Economic importance of Fungi.

Unit III (12 hrs)

Bryophyte, Pteridophyte and Gymnospermae.

A study on the structure and life cycle of the following genera- *Funaria*, *Lycopodium* and *Cycas*.

Unit IV (12 hrs)

Plant physiology; Osmosis. Absorption of water, Photosynthesis – Light reaction – Calvin cycle. Plant Movements - Photoperiodism.

Unit V

(12 hrs)

Plant ecology; Factors affecting vegetation – Climatic factor, Morphological and Anatomical adaptations in hydrophytes, xerophytes and Mesophytes.

Text Books:

1. Text book of Algae. 2015, K.S.Bilgrami and L. C. Saha, 1st Edition, CBS Publishers.
2. Algae O. P. Sharma 2011, Tata McGraw-Hill Education.
3. *Advances In Mycology, 2012* Sohan Sharma. , Random Publications Publishers and Distributors, New Delhi.
4. B.P. Pandey 2011, A Textbook of Botany: Angiosperms - Taxonomy, Anatomy, Embryology and Economic Botany, S. Chand Limited
5. Pandey, B. P. 1986. Text book of Botany, Vol. I & II. S. Chand & Co. New Delhi.
6. Fuller, H. J. and Tippo, O. 1949. College Botany, Henry Holt & Company.
7. Ganguly, A. K. 1975. General Botany Vol. I (1971) and Vol. II. The new book stall, Calcutta.

References:

1. Vashishta B. R. A. K. Sinha. 2010. Botany for Degree student – Fungi. S. Chand & Co. New Delhi.
2. Panday.S.N., Misra. S.P and Trivethi P.S. 2009, A text book of Botany, Volume II , Vikas Publishing House Pvt. Ltd., Delhi.
3. Rao, K. N., Krishnamoorthy, K. V. and Rao, G. S. 1979. Ancillary Botany. S. VisvanathanPvt, Madras.

**Practical Syllabus B.Sc., (Allied Botany) Degree Examination
For Students Admitted from the academic year 2014 – 2015**

First Allied Practical I (For Allied Course I & III)

Morphology and Taxonomy

1. To describe in technical terms plants belonging to any of the families prescribed in the syllabus and to identify the family.

Economic Importance

2. To identify the genus, family and morphology of the parts used for the following plant specimens

Annona – Fruit	Pea (Pisum) – Seed
Groundnut – Fruit	Black Gram – Seed
Green Gram –Seed	Abrus – Seed
Tamarind – Fruit	Acacia (Soap nut) – Fruit
Luffa – Fruit Fibrous skeleton.	Eclipta – Plant
Cucumber – Fruit	Sunflower – Seed
Cinchona – Bark	Dates – Fruit
Horse Gram – Seed	Areca – Nut
Bengal Gram – Seed	Coconut – Kernal

Cytology

3. Observation of electron micrographs of sub-cellular structures.

Genetics

4. To Study the Monohybrid, Dihybrid and Incomplete dominance.

Anatomy

5. Study the anatomical characters of dicot root & stem

Embryology

6. Observation of permanent slides of reproductive parts of Angiosperms.

Algae and Fungi

7. Study of morphology of the vegetative and reproductive organs

Bryophytes

8. Study of morphology of the vegetative and reproductive organs

Pteridophytes

9. Study of morphology and anatomy of the vegetative and reproductive organs

Gymnosperms

10. Study of morphology and anatomy of the vegetative and reproductive organs

Plant physiology

11. Describe simple experimental setup in plant physiology

Ecology

12. Study the plant adaptations among the various habitats.

Core Practical
Model Practical Question Paper B.Sc., Botany Allied - Examination
For Students Admitted from the academic year 2014 – 2015
First Allied Practical I (For Allied Course I & III)

Time: 3 Hrs.

Maximum: 60 Marks

Practical : 50 Marks

Record : 10 Marks

1. Refer “A & B” to the respective families giving reasons. Diagrams not necessary
(10)
2. Identify the genus, family and morphology of the parts used for “C, D, E, F & G”
(15)
3. Cut transverse sections of “H & I” Stain and mount in glycerin. Identify giving reasons. Draw diagrams. Submit the slides for valuation
(10)
4. With suitable diagram write critical notes on “J, K, L, M, N & O” (12)
5. Comment on the setup “P” (3)

Key:

A & B – Any plants prescribed in the syllabus (Reason: 3, Identification: 2)

C, D, E, F & G – Prescribed in the syllabus

H & I – Prescribed in the syllabus.

J, K, L, M, N & O – Spotters.

P – Physiology Experiment.

B.Sc., Botany

For Students Admitted from the academic year 2014 – 2015

Core Course IV (Paper Code: 14U3BOC03)

MUSHROOM CULTIVATION TECHNOLOGY

Credit : 5

Total Hrs : 60

Objectives:

- To understand the mushroom morphology, Habitats and differentiation of Edible mushroom.
- To study the cultivation of mushrooms.
- To understand the composting, preparation of compost and methods of composting.
- To study about the spawn, spawn preparation and storage of spawn.
- To understand the cultivation of button, oyster and straw mushroom.

Unit: I (12 hrs)

Mushroom morphology: Different parts of a typical mushroom & variations in mushroom morphology. Key to differentiate edible from poisonous mushrooms. Common Indian mushrooms. Based on occurrence- Epigenous & Hypogenous, Natural Habitats-Humicolous, Lignicolous& Coprophilous, Structure and texture of fruit bodies-gilled fungal & pore fungal and spores.

Unit: II (12 hrs)

Fundamentals of cultivation system- small village unit & larger commercial unit. Principles of mushroom farm layout- location of building plot, design of farm, bulk chamber, composting platform, equipments& facilities , Sterilization room & growing rooms.

Unit: III (12 hrs)

Principles of composting, machinery required for compost making, materials for compost preparation. Methods of Composting – Long Term and Short Term method.

Unit: IV (12 hrs)

Facilities required for spawn preparation, Preparation of spawn substrate, preparation of pure culture, media used in raising pure culture, culture maintenance and storage of spawn. Importance of casing mixture, Quality parameters of casing soil, different types of casing mixtures, commonly used materials.

Unit: V**(12 hrs)**

Cultivation of Button, Oyster and straw mushroom - Collection of raw materials, compost & composting, spawn & spawning, casing & case run, cropping & crop management, picking & packing. Production technology and post-harvest handling of fresh and processed products and their marketing. Nutrient profile and health benefits of mushroom.

Text Books:

1. R. K. Pandey & S. K. Ghosh. 2012. A Hand book of Mushroom cultivationion . Emkay Publications. New Delhi.
2. Tripathi, D.P. 2005 Mushroom Cultivation, Oxford & IBH Publishing Co. PVT.LTD, New Delhi.
3. R.N. Verma and B.Vijay 2006. Recent Advances in the cultivation Technology of edible mushrooms.

Reference Books:

1. PathakYadav Gour. 2010 Mushroom Production and Processing Technology Published by Agrobios (India).
2. S. Kannaiyan & K. Ramasamy 1980. A hand book of edible mushroom, Today & Tomorrows printers & publishers, New Delhi
3. Nita Bahl 2002.Handbook on Mushrooms, Oxford & IBH Publishing Co., New Delhi.

Core Practical

For Students Admitted from the academic year 2014 – 2015

Mushroom Cultivation Practical (14U3BOCP02)

1. Identification of edible and poisonous mushrooms
2. Microscopic observations of mushrooms
3. Pure culture of mushroom-preparation and maintenance
4. Spawn- media preparation, inoculation, and incubation.
5. Substrate formulations, composting, and pasteurization.
6. Spawning, casing and maintenance of optimum.
7. Cultural conditions, hygiene, and management of pest and diseases.
8. Harvesting, processing and value addition.
9. Qualitative determination of nutritional values
10. Field visit to mushroom cultivation farm.

B.Sc., Botany

For Students Admitted from the academic year 2014 – 2015

Skill Based Elective Course I (Paper Code: 14U3BOS01)

Economic Botany

Credit : 2

Total Hrs : 36

Objectives:

- To study the Origin, History, Botanical description, Cultivation, Harvesting and uses of Cereals;
- To study the Origin, History, Botanical description and uses of Vegetables and Fruits. Origin, History, Botanical description, Cultivation and uses of spices.
- To study the Origin, History, Botanical description, Cultivation, Harvesting and uses of Beverages.
- To study the Origin, History, Botanical description, Cultivation, Harvesting and uses of fatty oils.

Unit I

(6 Hrs)

Origin, History, Botanical description, Cultivation, Harvesting and uses of Cereals (Wheat, Rice, Maize and Sorghum) and Legumes (Black gram, Red gram and Chick pea).

Unit II

(7 Hrs)

Origin and History, Botanical description and economic importance of Vegetables (Potato, Cassava and Tomato) and Fruits (Banana, Grapes, Citrus, Mango and Jack fruit).

Unit III

(8 Hrs)

Origin and History, Botanical description, Cultivation and uses of Spices (Ginger, Pepper, Cardamom, Clove) and Condiments (Chilly, Coriandrum and Turmeric).

Unit IV

(8 Hrs)

Origin and History, Botanical description, Cultivation, Processing and uses of Beverage plants: Tea, Coffee and Cocoa. Sugars and Starch: Sugarcane and Manihot. Fibers and Timber: Cotton, Jute, Teak, Sal and Mahogany.

Unit: V**(7 Hrs)**

Origin and History, Botanical description, Harvesting, Extraction and uses of Fatty oils and Vegetable Fats: Sun flower, Peanut, Palm Oil, Coconut and Gingelly. Medicinal Plants: Rauwolfia, Aconitum, Saraca and Neem.

Text Books:

1. Pandey, B.P. Economic Botany 2012. S. Chand & Company Ltd. New Delhi. Fourth Edn.
2. RashtraVardhana. Economic Botany. 2009. Arup Book Publishers Pvt. Ltd., New Delhi, First Edn.
3. Verma, V.A. Textbook of Economic Botany.1980. Emkay Publications, New Delhi, Third Edn.
4. Maheshwari P. & Singh, U. Dictionary of Economic plants in India. I.C.A.R., New Delhi, 1965.

References:

1. Hill, A.F. Economic Botany; A 1952. Textbook of Useful Plants and Plant Products. McGraw-Hill Book co., Inc., New York, Second Edn.
2. Thompson, H.C. 1949. Vegetable Crops. McGraw- Hill Book co., Inc., New York, Fourth Edn.
3. Wallis, T.E. 1946. Text book of Pharmacognosy. J. &A. Churchill Ltd., London.

B.Sc., Botany
For Students Admitted from the academic year 2014 – 2015
Non Major Elective Course I (Paper Code: 14U3BON01)

Semester III
MUSHROOM CULTIVATION

Credit : 2
Total Hrs. : 36

Objectives:

- To understand the scope of cultivation, types and nutrient content of Edible mushroom.
- To study the pure culture of Edible mushroom.
- To understand the cultivation technology.
- To study about the mushroom food preparation and research centres of mushroom.

Unit I **(6 hours)**

Introduction – history – scope of edible mushroom cultivation – types and nutrient content of edible mushrooms available in India – *Volvariella volvacea*, *Pleurotus citrinopileatus*, *Agaricus bisporus*. Poisonous mushrooms.

Unit II **(8 hours)**

Pure culture – preparation of medium (PDA and Oatmeal agar medium), sterilization – preparation of test tube slants to store mother culture – culturing of *Pleurotus* mycelium on petri plates, preparation of mother spawn in saline bottle and polypropylene bag and their multiplication.

Unit III **(7 hours)**

Cultivation Technology : Tools and requirements: substrates (locally available), Polythene bag, vessels, inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Mushroom bed preparation – paddy straw, maize straw, sugarcane trash, and banana leaves. Factors affecting the mushroom bed preparation – Low cost technology, Composting in mushroom production. Methods of mushroom production. Harvesting of mushrooms.

Unit IV **(7 hours)**

Storage and Nutrition: Short term storage (Refrigeration – up to 24 hours), Long term Storage (Canning, pickles, papads), drying, storage in salt solution. Nutrition – proteins – amino acids, mineral elements nutrition – carbohydrates, crude fiber content – vitamins.

Unit V

(8 hours)

Food preparation: Types of foods prepared from mushroom – soup, cutlet, omelette, samosa, pickles and curry. Research centers – National level and Regional level. Cost benefit ratio – Marketing in India and abroad, Export value.

Text Books:

1. R. K. Pandey & S. K. Ghosh. 2012. A Hand book of Mushroom cultivation . Emkay Publications. New Delhi.
2. Mushroom Cultivation, Tripathi, D.P. 2005 Oxford & IBH Publishing Co. PVT.LTD, New Delhi.
3. R.N. Verma and B.Vijay. 2006.Recent Advances in the cultivation Technology of edible mushrooms.

Reference Books

1. Marimuthu, T. Krishnamoorthy, A.S.Sivaprakasam, K. and Jayarajan.R. 1991. Oyster Mushrooms, Department of Plant Pathology, TamilNadu Agricultural University, Coimbatore.
2. Swaminathan, M. 1990. Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88 mysore Road, Bangalore – 560018
3. Tewari, Pankaj Kapoore, S.C. 1988. Mushroom cultivation, Mittal Publication, Delhi.
4. Nita Bahl. 1984-1988. Hand book of Mushrooms, II Edition, Vol. I &Vol. II

B.Sc., Botany
For Students Admitted from the academic year 2014 – 2015
Core Course VI (Paper Code: 14U4BOC04)

Anatomy, Embryology and Seed Science

Credit : 5

Total Hrs : 60

Objectives:

- To understand the meristems and ergastic substances.
- To study the simple and permanent tissues and primary structures of stem in dicots and monocots.
- To understand the secondary growth and nodal anatomy of dicots and monocots.
- To understand the embryology of angiosperms.
- To study the general principle. Seed quality, seed viability and field and seed inspection.

Unit I **(12 Hrs)**

Anatomy - Introduction. Meristems, definition, differentiation, redifferentiation and dedifferentiation, totipotency. Ergastic Substances (Cystolith, Raphides, Sphaeroraphides & Tannins). Classification of meristems – apical meristems, lateral meristems and intercalary meristems, various concept of apical meristems. Epidermal tissue system – trichomes and stomata. Laticifers.

Unit II **(12 Hrs)**

Plant tissue: Classification – Simple tissues and permanent tissues - Parenchyma, Collenchyma, Sclerenchyma. Complex tissues: Xylem and Phloem Annual rings – heart wood, sap wood. Primary structure of root and stem in dicots and monocots. Isobilateral and dorsiventral leaf.

Unit III **(12 Hrs)**

Secondary growth - Anomalous secondary growth in dicot stems –*Bignonia*, *Nyctanthus* and *Boerhaavia* and monocot stem -*Dracaena*. Nodal anatomy – uni, tri and multilacunar node. Root stem transition.

Unit IV

(12 Hrs)

Embryology - Structure and development of anther. Development of male gametophyte. Ultra structure of pollen grains. Types of ovules. Development of female gametophyte: Monosporic (*Polygonum*), Pollination, fertilization, double fertilization and triple fusion. Endosperm: Nuclear, Cellular, Helobial and Ruminant. Development of Embryo in Dicot (*Capsella – bursa pastoris*) and monocot. Polyembryony. Apomixis.

Unit V

(12 Hrs)

Introduction – role and goal of seed technology. General principle of seed production – seed quality – purity of seed production, seed viability – seed germination test, tetrazolium test. Types of seed germination – hypogeal and epigeal. Field and seed inspection - seed certification- seed legislation.

Text Books:

1. Pandey, B.P. 2014. Plant anatomy, S.Chand and Co., New Delhi.
2. Vashista, P.C. 2000. A text book of Plant Anatomy. S.Chand and Co., New Delhi.
3. Bhojwani, S.S. and Bhatnagar, S.P. 2009. The Embryology of Angiosperms, Vikas Publishing House Pvt. Ltd., New Delhi.
4. Dwivedi, J.N., 1988. Embryology of Angiosperms. Rastogi and Co., Meerut.
5. Rattan Lal Agarwal. 2004. Seed technology. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

Reference Books

1. Fahn, A. 1982. Plant Anatomy (3rd edition). Pergoman Press, Oxford.
2. Esau, K. 1960. Plant Anatomy, Wiley Eastern Private Limited. New Delhi.
3. Maheswari, P. 1971. An introduction to the Embryology of Angiosperms. Tata McGraw Hill Publishing Co., Ltd., New Delhi.

Core Practical

For Students Admitted from the academic year 2014 – 2015

Anatomy, Embryology and Seed Science-14U4BOCP02

Anatomy:

1. Study of Ergastic substances (Cystolith, Raphides, Sphaeroraphides&Tannins)
2. Study of simple and complex tissues by using permanent slides.
3. Study of dorsiventral and isobilateral leaf.
4. Study of primary structure of dicot root, stem.
5. Study of primary structure of monocot root and stem.
6. Normal secondary structure in dicot stem and root.
7. Anomalous secondary structure in dicot plants – *Aristolochia*, *Bignonia*, *Nyctanthus* and *Boerhaavia* (Permanent slides)
8. Anomalous secondary growth in monocot plant - *Dracaena* (Permanent slide)
9. Study the anatomical structure of types of node
10. T.S. of anther (Permanent slide).
11. Types of ovules (Permanent slides).
12. Types of embryo mounting.
13. Types of seed germination – hypogeal and epigeal.

B.Sc., Botany
For Students Admitted from the academic year 2014 – 2015
Skilled Based Elective Course II (Paper Code: 14U4BOS02)

Fundamentals of Microbiology and Plant Pathology

Credit: 2

Hours: 36

Objectives:

- To understand the classification and nomenclature of microbes.
- To study about the sterilization and disinfective agents.
- To understand the classification bacteria, viruses and culture media and types.
- To understand the classification, causes and control measures of plant diseases.
- To study the symptoms, etiology and control measures of some important plant diseases.

UNIT-I

(7 hours)

Definition and Scope of Microbiology, History and recent developments (in brief), Classification of Microbial Kingdom- Whittaker's system of classification, Binomial Nomenclature of Microbes, Classification of microbes.

UNIT-II

(7 hours)

Sterilization- Principles – dry & moist heat - Tyndallisation, Pasteurisation and Autoclaving, Radiation and Filtration-Disinfection and Disinfective agents – Sterility control for dry heat, moist heat and Radiation.

UNIT-III

(7 hours)

Bergey's classification of Bacteria, Viral classification, Virions and viroids, culture media – Culture and its types - Batch, Fed-batch, Continuous, Industrial use of Microbes – substrates, growth parameters and recovery of products (organic acids – Citric acid, antibiotics – Penicillin and enzymes - Amylase).

UNIT-IV

(8 hours)

A general account of plant diseases, causal agents and symptoms - bacteria, fungi, viruses, nematodes, insects, pests and rodents. Insect transmission of bacteria and viruses. Disease control - physical, chemical and biological methods.

UNIT-V

(7 hours)

Study of symptoms, etiology and control measures of the following diseases – Fungal (Red rot of Sugarcane), Bacterial (Bacterial Blight of rice, Citrus canker) & Viral (Tobacco mosaic disease)

TEXTBOOKS:

1. Dubey R.C and Maheshwari D.K 2005. A Text book of Microbiology S.Chand & Co Ltd, New Delhi.
2. Powar CB and Dainwala HF. 2005. GM, Volume I & II, 8th Edition, Himalaya Publishing House, Mumbai.
3. Patel AH. 2005. Industrial Microbiology Published by Mac Milan India Ltd. Chennai.
4. Pandey, B.P. 2008. A text book of plant pathology, S. Chand & Co, New Delhi.
5. Sharma P.D. 2006. Plant Pathology, Narosa Publishing House, New Delhi.
6. Pelzer T R. MJ, Chan ECS and Kreig N.R 1993. Microbiology Mc Graw –Hill Inc, New York.
7. Robert F Boyd 1984. GM. Times Minor/ Mosby College Publishers.
8. Prescott LM, JP Harley and DA Klein. 1993. Microbiology, 2nd Edition, WM, C Brown Publishers.

REFERENCE BOOKS

1. Sundara Rajan S. 2003. College Microbiology. Volume I & II Revised Edition, Vardhana Publication, Bangalore.
2. Robert, I. Tate. 1995. Soil Microbiology, First edition, John Wiley & Sons Inc. New York.
3. Hugo, W B and AD Russell. 1998. Pharmaceutical Microbiology, Sixth Edition, Black Well Scientific Company Ltd.
4. Jeffrey C. Pommerville. 2004. Alcamo's Fundamentals of Microbiology, Seventh Edition, Jones and Barlett Publishers.
5. Rangasami G. 1994. Diseases of Crop Plants in India, Printice Hall of India Ltd.
6. Sharma J.R. 1994. Principles and Practice of Plant Breeding, Tata McGraw Hill, New Delhi.
- 7.

B.Sc., Botany
For Students Admitted from the academic year 2014 – 2015
Non Major Elective Course II (Paper Code: 14U4BON02)

Herbal Botany

Credit : 2

Total Hrs.: 36

Objectives:

- To understand the Indian systems of zmedicines.
- To study the ethanobotany and native medicines.
- To understand the cultivation, macro and microscopic characters, chemical constituents and therapeutic uses of selected medicinal plants.
- To understand the cultivation, macro and microscopic characters, chemical constituents and therapeutic uses of drugs from flowers, fruits and seeds.
- To study the drug acting on CNS, gastrointestinal tract and cardiovascular system.

Unit I **(7 hours)**

Brief history of medicinal plants. Indian systems of Medicine: Siddha. Ayurvedha and Unani. Classification of crude drugs. Chemistry of drugs (Alkaloids, Flavanoids, Glycosides and Tannins).

Unit II **(7 hours)**

Ethnobotany – its scope and interdisciplinary approaches. Tribal distribution and life style in Tamilnadu. Native medicine – Malayalis, Irulas and Thodas. Common practice – rituals, mode of preparation, mode of administration and dosage. Folklore medicine.

Unit III **(7 hours)**

Cultivation, macro and microscopic characters, chemical constitutions and therapeutic uses of drugs from root (*Vinca rosea* and *Rauwolfia serpentine*), drugs from bark (*Cinchona officinalis*), drugs from stem of wood (*Ephedra sps*) and drugs from underground stem (*Zingiber officinale*).

Unit IV **(7 hours)**

Cultivation, micro and macrostructure, chemical constitutions and therapeutic uses of leaves (*Aloe vera* and *Ocimum sanctum*), flower (*Eugenia jambolana*), fruits and seeds (*Feronia elephantum* and *Coriandrum sativum*).

Unit V**(8 hours)**

A brief account on drugs acting on central nervous system (CNS stimulants, CNS depressants and Hallucinogenics). Drugs used in disorders of gastrointestinal tract (Carminatives, Bulk laxatives and Purgatives) and cardio vascular drugs (Cardiotonics, Cardia depressants and Antihypertensives).

Text Books

1. Jain, S.K.1987. A Manual of Ethnobotany. Scientific Publishers – Jodhpur.
2. Bhattacharjee, S.K.1988. Hand book of medicinal plants. Pointer publishers, Jaipur.
3. Wallis, T. E., 1997. Text Book of Pharmacognosy C.B.S Publishers.
4. Purohit and Vyas, 2004. Medicinal plants cultivation, Agrobios Publication, Jodhpur.

Reference Books

1. Gokhale, S.B., C.K.Kokate and A.P. Purohit (2010). Pharmacognosy Nirali Prakashan, Pune.
2. Jain, 2001. Medicinal Plants. National Book Trust, New Delhi.
3. Handa, S.S. and V.K.Kapoor. 1993. Pharmacognosy. Vallabh Prakshan, New Delhi.
4. Agarwal, 1985. Drug Plants in India. Kalyari Publishers, Ludhiyana.

Core Practical
For Students Admitted from the academic year 2014 – 2015
Core Major Practical II (For Core Course IV &VI)
(Mushroom Cultivation Technology, Anatomy, Embryology and Seed Science
14U4BOCP02

Time: 3Hrs

Max. marks : 60

Practical : 50

Record: 10

1. Cut transverse section of **A, B** and **C**. Stain and mount in glycerin. Identify giving reasons. Draw diagrams. Leave the slides for valuation. (24)
2. Make suitable Mushroom bed preparation of **D**. Leave the bed for valuation. (10)
3. Dissect and mount any one of the stages of the given material **E**. (Diagrams and notes not necessary) (6)
4. Name the genus and morphology of given part of **F** and **G**. (4)
5. Write notes on **H, I** and **J**. (6)

Key:

- A** - Angiosperm – Anatomy – vegetative part
- B** - Angiosperm – Anatomy – vegetative part
- C** - Mushroom – microscopic examination
- D** - Mushroom Cultivation—Preparation of Beds
- E** - Embryo – Dicot - *Tridax*
- F & G** - Macroscopic-Types of Mushrooms
- H, I & J** -Permanent slides (Anatomy, Embryology and Seed science)

Semester V
Core Course VII (Paper Code: 14U5BOC05)
MORPHOLOGY AND TAXONOMY OF ANGIOSPERMS

Credit: 5

Hours: 60

Objectives:

- ❖ Understand the morphology of the angiospermic plants.
- ❖ Understand the reproductive parts of the angiospermic plants.
- ❖ Understand the different types of angiosperms classification.
- ❖ Understand the vegetative and reproductive characters and economic importance of selected families.

UNIT-I **(12 hrs)**

The parts of Plant, Root- Types and Modifications, Stem- Types, Aerial and Underground Stem Modifications, Leaf- Phyllotaxy, Simple and Compound leaves, Leaf parts - Leaf base, Stipule, Petiole, Lamina- shape, apex, margin, surface, texture, Venation and Modifications of leaf.

UNIT-II **(12 hrs)**

Inflorescence Types – Racemose, Cymose and special types (Cyathium, Hypanthodium). Flower- essential and non-essential parts and its arrangements (Bract, Bracteoles, calyx and corolla shapes, androecium, gynoecium- placentation, floral diagram and floral formula). Fruit - classification of fruits (Outline only). Seed dispersion and types of germination of seed.

UNIT-III **(12 hrs)**

History of Taxonomy - Systems of classification - Artificial system (Linnaeus) - Natural system (Bentham & Hooker), Phylogenetic system (Engler & Prantl), Merits and Demerits of their systems. Binomial nomenclature, Author citation. Herbarium Techniques and BSI.

UNIT-IV **(12 hrs)**

Terminology used in Taxonomy. A detailed study of the following families and their economic importance: Annonaceae, Nymphaeaceae, Capparidaceae, Rutaceae, Anacardiaceae, Fabaceae, Caesalpiaceae, Mimosaceae, Cucurbitaceae, Apiaceae.

UNIT – V **(12 hrs)**

A detailed study of the following families and their economic importance: Rubiaceae, Asteraceae, Asclepiadaceae, Apocynaceae, Acanthaceae, Lamiaceae, Sapotaceae, Verbinaceae, Amarantaceae and Poaceae.

PRACTICAL

1. Study of the morphology of angiosperms as mentioned in theory part, with the help of suitable examples.
2. Description of plants in technical terms.
3. Dissection of vegetative and floral parts of plants belonging to the above families.
4. Study of the Botany of the economic plants in the theory part.
5. Field trip to hill stations recommended for three to five days under the guidance of teachers.
6. Herbarium (minimum of 20 Herbarium sheets of weeds and common plants of Angiosperms) with the proper field note book shall be submitted at the Practical Examination.

TEXT BOOKS

1. Gangulee, H.C., Das, K. S. & Datta, C.T. (1964). – College Botany – Volume I, Basant Panchami, Calcutta.
2. Pandey, S.N. and Misra, S. P. (2008). Taxonomy of Angiosperms. Ane Books Private Limited, New Delhi.
3. Pandey, P. B. (1989). Taxonomy of Angiosperms (Systematic Botany), S. Chand & Co. Ltd., New Delhi.
4. Pandey, B.P. (2000) – Economic Botany, S. Chand & Co., New Delhi.
5. Singh. V. and Jain, D. K. (2004). Taxonomy of Angiosperms. Rastogi Publications, Meerut.
6. Sambamurty, A.V.S.S. (2005). Taxonomy of Angiosperms. I.K. International Pvt. Ltd., New Delhi
7. Vashista, P. C. (1997). Taxonomy of Angiosperms. S. Chand & Co., New Delhi.

REFERENCE BOOKS

1. Lawrence, G. H. M (1953). Taxonomy of Vascular Plants, Oxford & IBH Publishes, New Delhi.
2. Mathews, K.M, (1987 – 90). Flora of Tamil Nadu and Carnatic (1 – 4 Vols.) Rapinat Herbarium, Trichy.
3. Narayanaswamy, R.V & Rao, K. N. (1976). Outlines of Botany, S. Viswanthan Printers & Publishers, Madras.

Model practical question paper for B.Sc., Botany Degree Examination

Core Major Practical III (For Core Course VII and VIII)

(Morphology and Taxonomy of Angiosperms, Cell Biology and Genetics) - 14U6BOCP03

Time: 3Hrs

Maximum : 60 marks

Practical : 40 marks

Herbarium: 10 marks

Record : 10 marks

1. Refer **A** to their respective families. Point out the characters on which the identification is based at each level. (Diagrams not necessary) (5)
2. Describe **B** in technical terms. Draw diagrams of the floral parts only. Construct the floral diagram. Give the floral formula (5)
3. Dissect and mount the given part **C** for valuation. (Aestivation/ anther/ Placentation) draw diagrams (4)
4. Make acetocarmine preparations of **D** (squash) (any one stage) draw diagrams. (4)
5. Construct chromosome map with the data provided (5)
6. Solve the given genetic problems **E** and **F**. (6)
7. Write note on **G** (3)
8. Write the name of the Genus, species, Family and morphology of the useful Parts of **H** & **I** (8)

KEY:

- A, B & C** - Families under Taxonomy
- D** - Cell biology
- E&F** - Genetics
- G** - Cell biology spotters
- H & I** - Morphology

Semester V
Core Course VIII (Paper Code: 14U5BOC06)
CELL BIOLOGY AND GENETICS

Credit: 5

Hours: 60

Objectives:

- ❖ Understand the ultra structure and cell organelles of plant cell.
- ❖ Understand the DNA and RNA structure and cell division.
- ❖ Understand the Mendelian laws and inheritance.
- ❖ Understand the linkage and crossing over.
- ❖ Understand the sex determination and mutation and its types.

Unit I

Ultra structure of plant cell and cell theory. Cell wall, Plasma membrane: Chemical composition, Models for structure of membrane,

Cell organelles: Structure and functions of Endoplasmic reticulum, Golgi complex, Lysosome, Peroxisome, Glyoxysome, Mitochondria, Chloroplast, Ribosomes and Nucleus.

Unit II

Nucleic acids: DNA structure, types, replication. RNA structure, types. Chromosome - Molecular structure of gene and chromosome. Types of chromosomes- based on the position of centromere, Polytene chromosome and lamp brush chromosomes.

Cell cycle, Amitosis, Mitosis and Meiosis.

UNIT III

Definition of Genetics, Scope and applications of Genetics. Theories on inheritance : Vapor and fluid theories. Magnetic power theory, Preformation theories, Epigenetic theory, Particulate theories. Chromosome theory of heredity (Sutton - Boveri).

Johann gregor Mendel's experiments and laws of inheritance. Modifications of Mendelian ratios. Atavism, Penetrance, Expressivity, Pleiotropism. Incomplete dominance (in *Mirabilis jalapa*), Dominant Lethal factors (in Mice), Recessive lethal factors (in *Snapdragon*), Complementary factors (flower colour in *Lathyrus odoratus*), Dominant Epistasis (Friut colour in *Cucurbita*), Recessive Epistasis (Petiole length in Tobacco) Multiple factors (Colour of wheat kernel) and Multiple alleles (Self sterility in *Nicotiana*, Blood groups in man).

UNIT IV

Linkage: Types- complete linkage and incomplete linkage. Linked groups, Factors affecting linkage. Crossing over: Types, Mechanism of crossing over and theories on crossing over. Cytological evidence for crossing over. Factors affecting crossing over. mapping of genes on chromosomes, sex linkage-Drosophila (eye colour) and humans (Haemophilia), cytoplasmic inheritance (plastid inheritance, male sterility in corn)

UNIT V

Sex determination in *Melandrium*. Mutation: Types. Chromosome variation in number and structure, Syndromes in man (Klinefelter's syndrome, Turner's syndrome, Down's syndrome, Mongolism). Detection in *Neurospora*, CLB technique to detect mutation. Population genetics: Definition, Hardy - Weinburg principle, significance and its application. Factors affecting gene frequencies, Gene pool, Genetic drift and frequency.

PRACTICAL

Cell biology:

1. Study and Squash and Smear with suitable materials.
2. Study of induced aberrations in onion root tip using chemicals.
3. Observation of electron micrographs of sub-cellular structures.

Genetics:

1. Simple problems about segregation and independent assortment and gene interaction.
2. Chromosome mapping from three point test cross-data [Linkage and Crossing over percentage].
3. To study the population genetics problems applying Hardy-Weinberg law.

TEXT BOOKS:

1. David Freifelder. (1987). Molecular Biology. N. K. Narosa Publishing House, New Delhi.
2. Monroe W. Stickberger. (1985). Genetics. Rekha Printers Private Ltd., New Delhi.
3. Sambamurty, A. V. S. S. (2008). Molecular Biology. Narosa Publishing House Pvt. Ltd, Chennai.
4. Verma, P. S. and Agarwal, V. K. (2009). Genetics. S. Chand & Company Ltd., New Delhi.

REFERENCE BOOKS:

1. Robert H. Tamarin. (2002). Principles of Genetics. Tata Mcgraw – Hill Publishing Company Ltd., New Delhi.
2. Sumitra Sen, Dipak Kumar Kar, (2006). Cytology and Genetics. Narosa Publishing House Pvt. Ltd, New Delhi.
3. Sundararajan, S. (2000). Cytogenetics. Anmol Publications Pvt. Ltd., New Delhi.
4. Verma, P. S. & Agarwal, V. K. (2008). Cytology. Chand & Company Ltd., New Delhi.

Semester V

Core Course IX (Paper Code: 14U5BOC07)

PLANT ECOLOGY, PHYTOGEOGRAPHY AND CONSERVATION BIOLOGY

Credit: 4

Hours: 60

Objectives:

- ❖ Understand the importance of environment and its analytical method.
- ❖ Understand the basic concepts of ecosystem.
- ❖ Understand the vegetations, plant adaptations and importance, and prevention methods of environmental pollution.
- ❖ Understand the hypothesis, distributions and types of vegetations in India.
- ❖ Understand the conservation strategies and importance of environment education.

UNIT – I

(12 Hours)

Importance of study of Ecology, Concept, Components of Ecosystem – Biotic and Abiotic factors (Light, Temperature, Humidity and Wind). Study of plant communities - Autecology (Life forms, Peridiocity and floristic composition). Quantitative analysis of plant communities (Quadrat method).

UNIT – II

(11 Hours)

Types of Ecosystem- Natural and artificial ecosystems, study of pond, grassland and forest ecosystem. Energy flow, food chain, food web and ecological pyramids. Biogeochemical cycles – Carbon Cycle, Nitrogen Cycle, Phosphorus cycle and Hydrological Cycle.

UNIT – III

(14 Hours)

Vegetation - Development of vegetation-migration, ecesis, colonization. Plant succession hydrosere and xerosere. Plant adaptations – morphological and anatomical features – hydrophytes, xerophytes, epiphytes and parasites.

Environmental pollution: Atmospheric pollution- Air pollution, Soil Pollution, Water pollution, Noise pollution and radioactive pollution.

UNIT – IV

(12 Hours)

Phytogeography: Range - Dispersal and migration barriers hypothesis, Continental drift Hypothesis and Age and Area hypothesis, Endemism, Hotspots. Continuous and discontinuous Distribution of Plants. Phytogeographical regions in India. Vegetations of India.

UNIT – V

(11 Hours)

Conservation Biology - Introduction – Ecosystem approaches - Social approaches - Chipko movement. *In situ* conservation (Afforestation, Social Forestry, Agro Forestry and National parks and Sanctuaries) and *ex situ* conservation (Cryopreservation, Gene Banks, DNA Banks). Environmental Education.

TEXT BOOKS

1. Sharma, P.D. (2009). Ecology and Environmental, Rastogi Publishers, Meerut.
2. Shukla, R.S. Chande, I.P.S. (2012). Plant Ecology and Soil Science., S. Chand & Co., Chennai.
3. Vasishta, P. C, (1979), Plant Ecology, Vishal Publication. Kolkatta.
4. Verma V.A. (1981), A Text book of plant Ecology, Emkay publication, New Delhi.
5. Sharma, J.P. (2004). Environmental studies, Lakshmi Publications (P) Ltd, New Delhi
6. Kumaresan, V. Arumugam, N. 2015. Plant Ecology & Phytogeography, Saras Publication, Nagercoil.
7. Krishnamurthy, K. V. (2006). An Advanced Textbook on Biodiversity: Principles and Practice. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

REFERENCES BOOKS

1. Edward J. Kormondy, (1996). Concept of Ecology, Prentice Hill of India Pvt, Ltd. New Delhi.
2. George L. Clarke (1954). Elements of Ecology. John Wiley & sons. Inc., New York.
3. Odum E.P. (1971). Fundamentals of ecology, W.B. Saunders Co., Philadelphia, London.
4. K.N. Bhatia (2005) A Treatise on Plant Ecology, Pradeep Publications, Jalandhar.
5. Robert Smith, (1977). Elements of ecology and field biology, Harper and Row Publishers, New York, London.
6. Misra, R. (1986). Ecology work book, Oxford and IBH publishing company, New Delhi.

7. Mishra , D.D.(2009). Fundamentals concepts in Environmental studies. S. Chand & Co. Ltd, Chennai.

PRACTICALS

Study of Plant Communities – Simple Quadrat.

Study of the Morphological and Structural adaptation of hydrophytes, xerophytes, epiphytes and parasites to correlate to the particular habitat.

Phytogeographical regions in India, Types of forest and Vegetation. Types of Ecosystem.

Model practical question paper for B.Sc., Botany Degree Examination

Core Major Practical IV (For Core Course IX & XI)

(Plant Ecology, Phyto-geography, Conservation Biology, Plant Physiology and Biochemistry)- 14U6BOCP04

Time: 3Hrs

Maximum : 60 marks

Practical : 50 marks

Record : 10 marks

1. Outline the procedure, apparatus and materials required for investigating the physiological problem **A** assigned. Set up the experiment. Tabulate the data obtained and report the results. Leave the set up for valuation. (15)
2. Construct a simple quadrat **B**. Study the plant community and analyse the vegetation. (7)
3. Based on morphological and anatomical characters, assign **C** and **D** to their respective probable habitats. Draw suitable diagrams. Submit slides for valuation. (12)
4. Draw and comment on the set up **E**. (4)
5. Write a comment on **F, G, H** and **I**. (12)

Key:

- A** - Plant physiology individual experiments
- B** - Plant Ecology
- C & D** - Plant Ecology
- E** - Plant physiology demonstration
- F, G, H & I** - Plant physiology/ Biochemistry/ Plant Ecology/ Phyto-geographical regions/Conservation Biology

Semester V

ELECTIVE – I (Paper Code: 14U5BOE01)

PLANT BREEDING AND EVOLUTION

Credit: 5

Hours: 60

Objectives:

- ❖ Understand the selection and methods of plant breeding.
- ❖ Understand the hybridization techniques, heterosis, autopolyploidy and allopolyploidy in plant breeding.
- ❖ Understand the plant production and haploid plants in breeding.
- ❖ Understand the breeding for crop improvement with reference to selected crops..
- ❖ Understand the theories of evolution.

Unit-I

(12 hrs)

Introduction and objectives of plant breeding, its relationship with other sciences. Plant introduction, domestication and acclimatization. Selection and Methods of Plant Breeding- Pure, Clonal and Mass.

Unit II

(12hrs)

Hybridization techniques - interspecific and intergeneric hybridization - heterosis. Hybrid vigour and utilization. Mutation in breeding- Spontaneous Mutations, Mutagens and Induced Mutations Heterosis, Autopolyploidy, Allopolyploids in plant breeding. Genetic erosion: reasons and preventive methods

Unit-III

(12hrs)

Plant production and haploid plants in breeding. Apomixes- importance of male sterility, Plant Breeding for Production of high yield varieties, developing Resistance to Insect Pest, Production of disease resistant varieties.

Unit-IV**(12hrs)**

Breeding for crop improvement with reference to Paddy, Wheat, Sugarcane and Ground nut

Unit - V**(12hrs)**

Evolution -Origin of life-theories of organic evolution: Lamarckism, Neo-Lamarckism, Darwinism, Neo-Darwinism, Mutation theory and synthetic theory-speciation and isolating mechanisms. Modern synthetic theory of Molecular evolution.

Text Books

1. Allard, R.W (1960). Principles of Plant Breeding. John Wiley & Sons, New York.
2. Chaudhari, H.K. 1984. Elementary Principles of Plant Breeding. Oxford & IBH publishing Co. Pvt. Ltd., New Delhi.
3. Sharma, J. R. (1994). Principles and Practice of Plant Breeding, Tata McGraw Hill Publishing Co Ltd., New Delhi.
4. Shukla, R. S. and Chandel, P. S. (1977). Cytogenetics, Evolution and Plant Breeding, S. Chand & Co., New Delhi.
5. Verma, P. S. and Agarwal, V. K. (1998). Concepts of Evolution. S. Chand & Co, New Delhi.

Semester V

Skill Based Elective Course - III (Paper Code: 14U5BOS03)

Horticulture and Nursery management

Credit : 2

Total Hrs.: 36

Objectives:

- ❖ Understand the importance of horticulture in human welfare.
- ❖ Understand the basic concepts of garden designing.
- ❖ Understand the propagation methods of horticultural crops.
- ❖ Understand the cultivation practices of useful vegetable, fruit and flower plants.
- ❖ Understand the nursery management strategies.

Unit I

(7 hours)

Horticulture – Definition, Disciplines, Principles, Scope and Importance. Classification of horticultural crops – Fruits and Vegetables. Growth regulators in horticulture. Preservation of fruits and vegetables. Storage of fruits and vegetables.

Unit II

(7 hours)

Gardening - Garden tools and implements, types of garden - ornamental gardens, indoor gardens, kitchen gardens, terrestrial and aquatic gardens. Garden adornments, garden designing, garden components- lawns, shrubs and trees, borders, hedges, edges, drives, walks, topiary, trophy, rockery. Famous gardens of India.

Unit – III

(7 hours)

Vegetative propagation methods of horticultural crops- cutting, layering, budding and grafting. Advantages and disadvantages of vegetative propagation; micropropagation. Stock scion relationship in horticultural crops. Bonsai, Cut flowers. Flower arrangements - basic styles-upright and slanting. Japanese – ikebana and dry flower arrangement.

Unit – IV**(8 hours)**

Production technology – Olericulture - Cultivation of Brinjal and Cauliflower. Pomology - Cultivation of Apple and Pineapple. Commercial floriculture – Cultivation of jasmine and rose. Commercial horticulture - Extraction of Jasmine concrete and Papain.

Unit – V**(7 hours)**

Nursery - definition, types; management strategies- planning, layout, budgeting- production unit, sales unit. Types of soils and preparation of fields – Manures - organic and inorganic. Pots and containers – tools and implements – watering – types. Plant protection measures for horticulture.

Text Books

1. Adams, C.R. and Early, M.P. (2004). Principles of Horticulture. Elsevier, New Delhi.
2. Barton West, R. (1999). Practical Gardening in India. Discovery Publishing House, New Delhi.
3. *Chadha*, K.L. (2001). Hand Book of Horticulture, ICAR Publications, New Delhi.
4. *George Acquaaah*. (2009). Horticulture Principles and Practices. PHI Learning Private Limited, New Delhi.
5. Kumar, N. (2014). Introduction to Horticulture. Rajalakshmi Publications, Nagercoil.
6. Mazundar, B.C. and Mukhopadhyay, P.M. (2006). Principles & Practices of Herbal Garden. Daya Publishing House, New Delhi.
7. Percy Lancasher. (2004). Gardening in India. Oxford IBH Publishing Company Private Limited, New Delhi.
8. Sadhu, M.K. (1996). Plant Propagation. New Age International Publishers, New Delhi.
9. Sheela, V. L. (2011). Horticulture. MJP Publishers, Chennai.

Semester V

SBEC IV (Paper Code: 14U5BOS04)

FUNDAMENTALS OF COMPUTER APPLICATION

Credit: 2
Hours: 36

Objectives:

- ❖ Understand the characteristics and types of computer.
- ❖ Understand the components and functions of digital computer.
- ❖ Understand the objectives and functions of operating system.
- ❖ Understand the MS - Excel.
- ❖ Understand the MS – Power point.

UNIT-I

(7 hrs)

Introduction to computer: Introduction-type of computers-characteristics of computers-five generations of modern computers – classification of digital computer.

System: Introduction – microcomputers – personal computers – workstations – portable computers – minicomputers- mainframes – super computers- network computers.

Number systems: Introduction – decimal, binary, octal, hexadecimal number system.

UNIT-II

(7 hrs)

Anatomy of digital computer: Functions and components of a computer- central processing unit- control unit- arithmetic logic unit – memory – register addresses – memory units: types of main memory. Input devices: keyboard- mouse- OCR-OMR-Touch screen. Output devices: Printers- plotter-Auxiliary storage devices.

UNIT-III

(7 hrs)

Operating system objectives & functions: MS word – Learning word basics: Typing, Inserting, Selecting and Deleting text and inserting special characters. Formatting a word document: Enhancing text, Working with bulleted or numbered lists, Arranging text on a page, Working with tabs, Moving and copying text, drag and drop. Working with longer document: Setting page options, Managing page breaks, working with headers and footers. using keyboard shortcuts to edit a word document.

UNIT-IV

(8 hrs)

MS-Excel: Creating a simple spread sheet: Exploring the spread sheet, moving around the spread sheet screen, Entering data, editing data. Editing a spreadsheet: Learning selection techniques, inserting, deleting rows and columns. Working with functions and formula: Creating

formulas, editing entries, copying formulas, creating an absolute reference in formula, using functions. Formatting worksheets: Formatting numbers, adjusting column width, setting, setting cell alignment, formatting with fonts. Completing your spread sheet- Preparing to print, Creating a chart, modifying a chart, deleting a chart.

UNIT V

(7 hrs)

MS-Power point: Creating and viewing presentation: Creating a presentation, Adding text to a slide, Adding slides, adding bullet point text. Editing a presentation: Deleting and rearranging slides, Changing presentation designs, changing slide layouts, printing a presentation. Working with presentation special effects: Adding tables, inserting charts. adding transitions. Internet: Introduction, browsing, search engines.

Text books:

1. Diane Koers. (2001). Microsoft Office XP Fast and Easy. Prentice Hall of India Pvt. Ltd., New Delhi.
2. Alexis Leon and Mathews Leon. (2007). Introduction to Computers. Vikas Publishing House Pvt. Ltd., New Delhi

Reference Books:

1. Andrews. (2012). Computer Operating Systems. PHL Learning Pvt. Ltd., New Delhi.
2. Sumitabha Das, (2003) Unix-Concepts and Applications. Tata McGraw Hill Education Pvt. Ltd., New Delhi.

Semester VI

Core course - XI (Paper code: 14U6BOC08)

PLANT PHYSIOLOGY AND BIOCHEMISTRY

Credit: 5

Hours: 60

Objectives:

- ❖ Understand the diffusion, osmosis and imbibition.
- ❖ Understand the photosynthesis in higher plants and its significance.
- ❖ Understand the physiological effects of phytohormones.
- ❖ Understand the structure and functions of carbohydrates, amino acids, proteins and lipids.
- ❖ Understand the respiration and respiratory substrates.

UNIT I: WATER AND MINERAL NUTRITION

(12 hrs)

Structure and properties of water- Diffusion, osmosis, osmotic pressure, osmotic potential, turgor pressure, imbibition, matric potential. Absorption of water (active and passive). Ascent of sap; concepts of symplast and apoplast. Guttation and transpiration, Macro and Micro nutrients; Role of essential nutrients in plant metabolism and their deficiency symptoms and control measures.

UNIT II: PHOTOSYNTHESIS

Photosynthesis in higher plants-Definition and Significance. Electromagnetic radiation. Photosynthetic apparatus -photosynthesis and its evidences. Red drop and Emerson enhancement effect. Absorption spectrum, Action spectrum, Photosystems I & II, Fluorescence and phosphorescence. Photochemical phase- Electron transport chain, Photophosphorylation- (cyclic and non cyclic), Z - Scheme of Photosynthetic Electron Transfer. Biosynthetic phase-Benson and Calvin cycle, Hatch and Slack pathway. Photorespiration.

UNIT III: PLANT GROWTH AND DEVELOPMENT

The hormone concept in plants. Physiological effect of Auxins, gibberellins, cytokinins, abscisic acid and ethylene. Physiology of senescence and abscission. Plant movements- Phototropism, gravitropism. Nyctinastic and seismonastic movements. Photomorphogenesis: Phytochrome: chemistry and physiological effects. Photoperiodism Vernalization. Seed dormancy and germination.

UNIT IV: BIOCHEMISTRY

Biological nitrogen fixation, symbiotic nitrogen fixation in leguminous plants. Classification, Structure and functions of carbohydrates, Amino acids, Proteins and Lipids.

UNIT V: RESPIRATION AND ENZYMES

Respiration: respiratory substrates. Aerobic and anaerobic. Glycolysis. Krebs's Cycle and oxidative phosphorylation, energetics of respiration. Law of limiting factors. Enzymes Classification (IUB), Mechanism of enzyme action, Co-enzymes, inhibition, regulation: allosteric enzymes, Isoenzymes.

TEXT BOOKS:

1. Devlin, R.M. (1969). Plant Physiology. Holt, Rinehart & Winston & Affiliated East West Press (P) Ltd., New Delhi.
2. Jain, J.L. (1998): Fundamentals of Biochemistry. S. Chand & Co., New Delhi.
3. Jain, V.K. (1990). Fundamentals of Plant Physiology. S. Chand & Co., New Delhi.
4. Pandey, S.N. (1991). Plant Physiology. Vikas Publishing House (P) Ltd., New Delhi.
5. Sinha, R. K. (2007). Modern Plant Physiology. 2nd Edition, Tata McGraw Hill Publishing Co Ltd., New Delhi.
6. Verma, S.K. (1999). Plant Physiology & Biochemistry. S. Chand & Co., New Delhi.
7. Verma, V. (2001). A Text Book of Plant Physiology. Emkay Publications, New Delhi.

REFERENCE BOOKS:

1. Frank B. Salisbury and Cleon W. Ross (2002). Plant Physiology 3rd Edition. CBS Publishers and Distributors, New Delhi.
2. Harborne, J.B. (Eds.,) (2000). Plant Biochemistry. Harcourt Asia (P) Ltd., India & Academic Press, Singapore.
3. Lincoln Taiz and Eduardo Zeiger (2002). Plant Physiology. 2nd Edition. Sinauer Associates, Inc. Publishers. Sunderland, Massachusetts.
4. Ray Noggle, G. and George J. Fritz (2004). Introductory Plant Physiology. Prentice Hall of India Pvt. Ltd., New Delhi.

PRACTICALS

PLANT PHYSIOLOGY AND BIOCHEMISTRY

For demonstration only

1. Anaerobic respiration (Mercury experiment)
2. Demonstration of Hill reaction.
3. Effect of scarification on seed germination.
4. Demonstration of gravitropism using Klinostat.

To be performed by each student.

1. Effect of temperature and chemicals on membrane permeability.
2. Determination of DPD by plasmolytic method using onion/Rheo leaf.
3. Separation of plant pigments by paper chromatography
4. Determination of absorption and transpiration ratio of twigs.
5. Measurement of respiration rate using germinating seeds and flower buds with simple respiroscope.
6. Determination of photosynthetic rate in water plants under different CO₂ concentrations using Wilmott's bubbler.
7. Measurement of oxygen evolution under different coloured lights using Wilmott's bubbler.
8. Effect of light intensity on transpiration using Ganong's photometer.

Semester VI
Core course XII - Mini - Group - Project Work – 14U6BOPR01
4 Credits /6hrs/week

Project is a component of the active learning module that teaches approach and research techniques. Students would have a hand on experience in investigating a selected research problem where he/she shall be trained in framing and testing hypothesis through suitable research design. Students are required to select their research topic in the one of the following domain.

Allocation

- Students may select their broad research area during the end of the fourth semester and will be guided by a suitable research supervisor in the area allotted by the HOD.
- Each research supervisor may be allotted based on the number of students.
- Summer vacation may be used by the students to initiate their project work.

Objective of the study

- Topic investigated will have defined area of study.
- Project students will have hands on experience in all the basic instruments and techniques to conduct his/her original research.
- Minimum of 3 yrs of literature will be added in the review with recent publication of the year.

Evaluation

- Interim reports should be submitted by the students during the mid of sixth semester to the Head of the Department. This interim report should form the basis for the final project report. (Change in project work after the submission of interim report may be carried out only with prior permission of the HOD).
- Even research is carried out as a group, individual students will be evaluated.
- Evaluation will be based on the norms that will look into nature of the project work, the content of the dissertation, presentation duly summed up by a viva-voce examination.
- Attendance of the student for presentation and viva-voce is a must.

Dissertation format

- Introduction
- Review of literature
- Materials and methods
- Results
- Discussion
- Summary
- Bibliography

Semester VI
Elective Course II (Paper Code: (14U6BOE02))
Ethnobotany, Medicinal Plants and their Utilization

Credits : 5
Total Hrs.: 60

Objectives:

- ❖ Understand the ethnobotany, ethnic communities and application of ethnobotany.
- ❖ Understand the Indian system of medicine and classification of crude drugs.
- ❖ Understand the cultivation methods of medicinal plants.
- ❖ Understand the cultivation practices, chemical constituents and uses of medicinal plants.
- ❖ Understand the drugs acting on Central Nervous System, gastrointestinal tract and cardiovascular system.

Unit I **(12 hours)**

Ethnobotany: Definition; Ethnobotany in India, Ethnic communities of India and Tamil Nadu. Methods to study ethnobotany; Applications of Ethnobotany: Palaeo-ethnobotany. Folk medicines of ethnobotany, ethnomedicine and ethnoecology. Application of ethnomedicine to certain diseases- jaundice, diabetics, blood pressure and skin diseases.

Unit II **(12 hours)**

History, Scope and Importance of Medicinal Plants. Indian systems of Medicine: Siddha. Ayurvedha and Unani. Classification of crude drugs (Alphabetical, morphological, chemical, biological, pharmacological and chemotaxonomical).

Unit III **(12 hours)**

Breeding methods of medicinal plants – vegetative, asexual, sexual and tissue culture techniques. Drug adulteration. Drug adulteration – morphological or organoleptic, microscopic physical and chemical methods.

Unit IV **(12 hours)**

Cultivation, macro and microscopic characters, chemical constitutions and therapeutic uses of drugs from root (*Rauwolfia*), drugs from bark (*Cinchona*), drugs from stem of wood

(*Ephedra*), drugs from underground stem (*Zingiber*), drugs from leaf (*Aloe*), drugs from flower (*Eugenia*), drugs from fruit (*Feronia*) and drugs from seeds (*Trigonella*).

Unit V

(12 hours)

A brief account on drugs acting on central nervous system (Analgesics, CNS stimulants, CNS depressants and Hallucinogenics). Drugs used in disorders of gastrointestinal tract (Carminatives, emetics, Bulk laxatives and Purgatives) and cardio vascular drugs (Cardiotonics, Cardiac depressants and Antihypertensives).

Text Books

1. Arumugam, K. R. and Muruges, N. (2003). Text Book of Pharmacognosy. Sathya Publishers, Madurai.
2. Bhattacharya, A. K. and Hansda, R. (2003). Hand book of Medicinal Plants. Pointer Publishers, Jaipur.
3. Gokhale, S.B., Kokate, C.K. and Purohit, A.P. (2010). Pharmacognosy, Nirali Prakashan, Pune.
4. Handa, S.S. and Kapoor, V. K. (1998). Pharmacognosy. Vallabh Prakashan, New Delhi.
5. Jain. (2001). Medicinal Plants. National Book Trust, New Delhi.
6. Purohit and Vyas. (2008). Medicinal Plant Cultivation: A Scientific Approach, 2nd Edition, Agrobios Publication, Jodhpur.
7. Ravindra Sharma. (2003). Medicinal Plants of India (An Encyclopedia), Daya Publishing House, New Delhi.
8. Trivedi, P. C. (2006). Medicinal Plants: Ethnobotanical Approach, Agrobios Publication, Jodhpur.
9. Wallis, T.E. (1997). Text book of Pharmacognosy. C.B.S. Publishers and Distributors, New Delhi.

Semester VI
Elective - III (Paper Code: 14U6BOEO3)
PLANT BIOTECHNOLOGY, MICORSCOPY AND MICROTECHNIQUE

Credit: 5
Hours: 60

Objectives:

- ❖ Understand the principles of biotechnology.
- ❖ Understand the organogenesis and transgenic plants.
- ❖ Understand the principles and techniques of genetic engineering.
- ❖ Understand the principles of microscopy and types of microscope.
- ❖ Understand the permanent slide preparation.

UNIT – I **(12 hrs)**

Biotechnology – definition, history demand for biological resources, achievements. Plant tissue culture – History and principle – totipotency – Culture techniques – tissue culture media – MS media preparation – sterilization techniques.

UNIT – II **(12 hrs)**

Explant preparation and callus induction, Direct and indirect organogenesis. Micro propagation. Protoplast fusion – somatic embryogenesis. Application of Plant Tissue Culture in agriculture and forestry. Improvement of hybrid varieties – Transgenic plants, production of disease resistant crops, Production of stress resistant crops.

UNIT – III **(12 hrs)**

Genetic engineering – Scope and aims of genetic engineering, Principle and techniques – Gene isolation, Gene transfer system – Direct and indirect gene transfer – Use of Microbes as gene transfer Vehicles – *Agrobacterium tumefaciens*, Plasmid, Cosmid and Phages. Basic concept of recombinant DNA technology.

UNIT – IV **(12 hrs)**

Light Microscopy- principles, Lens-Refraction, Dispersion of light. Aberration of lenses- Spherical, Chromatic. Image formation, Image quality, Magnification-Resolution & Resolving power. Types of microscopes – Students compound microscope, Transmission Electron Microscope (TEM) and Scanning Electron Microscope (SEM)

UNIT – V

(12 hrs)

Permanent slide preparation – Fixation and fixatives, Clearing, Wax impregnation, Block making, Microtomes-Rotary Microtome and staining-Principles, Types (Natural and Chemical), Mordants. Types of staining – Single staining and Double staining, Mounting.

TEXT BOOKS:

1. Dubey, R. C. (2001). A Text Book of Biotechnology. S. Chand & Co. Ltd, New Delhi.
2. Ignacimuthu, S. (1996). Basic Biotechnology. Tata McGraw Hill Publishing Co. Ltd., New Delhi.
3. Kumaresan, V. (2001). Biotechnology, Saras Publications, Nagercoil.
4. Ashok Kumar. (2006). Plant Biotechnology. Discovery Publishing House, New Delhi.
5. Chukla, H. S. (2004). Introduction to Plant Biotechnology. Oxford and IBH Publishing Co
6. Jeyanto Achrekar. (2005). Concepts in Biotechnology. Dominant Publisher and Distributors,
7. Marimuthu, R. (2008). Microscopy and Microtechnique. MJP Publishers, Chennai.
Ltd., New Delhi.
New Delhi.

REFERENCE BOOKS:

1. Trivedi, P.C. (2000). Plant Biotechnology, Panima Publishing Corporation, New Delhi.
2. Lewin, B. (2003). Genes VI, Allied Publishers, Chennai.
3. Kalyan Kumar, D. (1999). An Introduction to Plant Tissue Culture, New Central Book Agency, Calcutta.
4. Sathyanarayanan, U. (2005). Biotechnology. Books and Allied (P) Ltd., Kolkata.

Semester VI
SBEC V (Paper Code: 14U6BOS05)
ORGANIC FARMING

Credits:2

Hours:36

Objectives:

- ❖ Understand the principles of organic farming.
- ❖ Understand the plant nutrient management and biofertilizer.
- ❖ Understand the organic plant production methods.
- ❖ Understand the organic plant protection methods.
- ❖ Understand the organic farming and national economy.

UNIT I

(7 hrs)

Organic farming - Principle, Scope, definition, concept and development. Relevance of Organic farming to India and global agriculture and future prospects. Organic farming land preparation and water management - land use, soil fertility, minimum tillage, shelter, zones, hedges, pasture management, agro-forestry. Water use efficiency.

UNIT II

(7 hrs)

Organic plant nutrient management - nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures and Biofertilizers.

UNIT III

(7 hrs)

Organic plant production: Farming systems, crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity. Organic plant protection: Cultural, Mechanical, botanical pesticides, control agents, weed management, use of biocontrol agents.

UNIT IV

(8 hrs)

Organic crop protection methods: Rice, Cowpea, Cucurbits, Mango, Banana, Turmeric.
Livestock management in organic farming.

UNIT V

(7 hrs)

Socio-economic impacts, Basic concept of economics - Demand, supply, Economic viability of farm. Basic principles of production, reducing expenses, ways to increase rerutns, cost of production system, organic farming and national economy. Marketing, Import and export potential: Socio-economic impacts inspection, certification, labeling and accreditation procedures.

Text Books

1. Ananthkrishnan, T. N. (1992). Emerging Trends in Biological Control of Phytophagous, Insects. Oxford & IBH Publishing Co Ltd., New Delhi.
2. Lampkin, N. (1990). Organic Farming. Press Books, Ipswich, UK.
3. Palaniappan, S. P. and Anandurai, K. (1999). Organic Farming – Theory and Practice. Scientific Publishers, Jodhpur.
4. Rao, B.V.V. (1995). Small Farmer Focused Integrated Rural Development: Socio-economic Environment and Legal Perspective. Parisaraprajna Parishtana, Bangalore.
5. Reddy M.V. (1995). Soil Organisms and Litter Decomposition in the Tropics. Oxford & IBH Publishing Co Ltd., New Delhi.
6. Sharma, A. (2002). Hand Book of Organic Farming. Agrobios, Jodhpur.
7. Singh, S. P. (1994). Technology for Production of Natural Enemies. PDDB, Bangalore.
8. Subba Rao, N.S. (2002). Soil Microbiology. Oxford & IBH Publishing Co Ltd., New Delhi.
9. Woolmer PL & Swift MJ. 1994. The Biological Management of Tropical Soil Fertility. TSBF & Wiley.

Semester VI
SBEC VI (Paper Code: 14U6BOS06)
HERBAL HOME REMEDIES

Credits: 2

Hours: 36

Objectives:

- ❖ Understand the role of the herbs in day-to-day life.
- ❖ Understand the herbal remedies and herbal first aid.
- ❖ Understand the herbal preparations and remedies of selected medicinal plants.
- ❖ Understand the organic plant protection methods.
- ❖ Understand the herbal medicine and food preparation methods.

UNIT – I **(7 hrs)**

History and role of the herbs in day-to-day life. Beneficial aspects of herbal plants as food -common greens .vegetables, fruit, seeds and edible oils (general account only).

UNIT – II **(7 hrs)**

Herbal remedies - herbal first aid, home remedies-for common cold, fever, headaches, migraines, digestive and respiratory disorders, ear, eyes, mouth and throat infections, Skin care using herbal products.

UNIT – III **(7 hrs)**

Herbal medicine preparation: Decoction, infusion, syrup, tincture and poultice. Food: herbal salad, chutney, soup and tea.

UNIT-IV **(7 hrs)**

Herbal preparation and remedies of *Solanum trilobatum*, *Centella asiatica*, *Cissus quadrangularis*, *Piper betel*, *Ocimum sanctum*, *Azadirachta indica*, *Curcuma longa*, *Zingiber officinalis* and *Lawsonia inermis*.

UNIT – V

(8 hrs)

Herbal preparation and remedies of *Murrya paniculata*, *Aerva lanata*, *Tribulus terresteris*, *Lippia nudiflora*, *Aloe vera*, *Moringa olifera*, *Vitex negundo*, *Allium sativum*, *Cardiospermum hallicacabum* and *Solanum nigrum*.

Text Books

1. Bentley, R. and Trimen, H. (2000). Medicinal Plants Volume –I – III. Asiatic Publishing House, Delhi.
2. Deshpande, D.J. (2006). A Hand Book of Medicinal Herbs. Agrobios, Jodhpur.
3. Edwin Jerald, E. & Sheeja Edwin Jerald. (1998). Text Book of Pharmacognosy and Phytochemistry, CBS Publishers & Distributors, New Delhi.
4. Gokhale, S.B., Kokate, C.K. and Purohit, A.P. (2010). Pharmacognosy, Nirali Prakashan, Pune.
5. Prajapathi, N. D. (2013). A Hand Book of Medicinal Plants. Agrobios, Jodhpur.
6. Sairam, T. V. (1999). Home Remedies Volume – I – V. Penguin Books India, Gurgaon.